

The Institutional Blind-spot in the Green Transition: Market Incentives versus Command-and-Control

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Abstract

This article questions the neoclassical claim that compared to command-and-control instruments such as performance standards, economic policy instruments, e.g., taxes or emission allowance schemes, represent a superior policy approach to mitigate industrial pollution. Based on recent research, we argue that the ongoing transition towards zero-carbon production processes involves specific challenges, which tend to strengthen the case for the use of standards-based regulations, not least quantitative performance standards. At the same time, empirical research suggests that this regulatory approach is not necessarily adopted as crudely as some economic models (and textbooks) suggest. Efforts can be undertaken to reduce the cost of compliance and incentivize technological change. These, in turn, must address the entire set-up of the regulatory systems, including knowledge generation and transfer, social trust, and the forms of relationship between regulators and industry. All in all, it is essential to abstain from simplified normative arguments about instrument choices in environmental policy regardless of the institutional context.

JEL codes: B25, Q38, Q55.

Key words: green transition; environmental regulation; institutional context; market-based instruments.

Introduction

Environmental regulation and unpredictable permitting processes are often claimed to stand in the way of the ongoing transition towards zero-carbon technologies in industry and the energy sector. This standpoint is in part reflected in recent policy initiatives, such as the Inflation Reduction Act in the USA and the Net Zero Industry Act in the European Union. This green versus green dilemma begs the question how environmental regulations can be designed and implemented to regulate local pollution into air and water while at the same time providing favorable conditions for novel investments in technologies and production processes that contribute to climate mitigation.

Nevertheless, the academic and political debates about how to deal with this dilemma – including calls for regulatory reforms – often reflect the fact that the command-and-control approach to industrial pollution, i.e., performance and technology-based standards, has a bad reputation. Market-based instruments, such as emission taxes or allowance schemes, are claimed to be superior, e.g., in terms of cost-effectiveness and incentives for green technological change (e.g., Goulder and Parry 2008). These neoclassical economics claims, though, ignore the institutional context in which various policy instruments are implemented (Swaney 1992).

This article puts forward and discusses two inter-related arguments. *First*, the ongoing transition towards zero-carbon production processes involves specific challenges, which tend to strengthen the case for the adoption of command-and-control regulations, not least quantitative performance standards. This includes that there is a need for technological innovation, and empirical research suggests that standards could provide a significant spur to green technological development. In addition, long-term credibility in policy is key in the transition, and this also speaks in favor of standards. *Second*, realizing this potential for the command-and-control approach in practice requires that attention is devoted to the institutional context in which such instruments are implemented, i.e., the entire set-up of the regulatory systems, including knowledge generation and transfer, social trust, and the forms of relationship between regulators and industry.

Market Incentives versus Command-and-Control

Academic scholars and policy experts frequently debate the proper choice of policy instruments for reducing industrial pollutants. As the modern environmental policies emerged during the 1960s and 1970s, many developed countries chose to adopt what is typically referred to as a command-and-control approach to industrial pollution using limits (standards) on emissions. Nonetheless, the view on performance and technology standards as instruments shifted in the 1980s as these, according to critics, led to excessive costs and inflexible solutions for society and firms (Gunningham 2009). As the command-and-control approach was criticized, the political view also shifted towards market-based approaches and deregulation.

This shift towards market-based instruments was endorsed by economists as the command-and-control approach was deemed to be inferior to economic instruments. A frequently used textbook example is the comparison between setting a uniform tax on emissions by industry or group of industrial plants, or a regulatory approach in which industrial plants are assigned plant-specific performance standards for emissions (Baumol and Oates 1988). This identifies two weaknesses with the standards-based approach.

First, the abatement costs faced by polluting plants usually vary due to differences in production processes, and the regulators face significant informational requirements when imposing plant-specific performance standards. This results in firm-regulator information asymmetries as plant owners regularly have more knowledge about plant-specific abatement costs than the regulators. In addition, they typically lack incentives to reveal the true abatement costs to regulators and could even opt to indicate high abatement costs to reduce the risk of facing stricter standards in the future. An emission tax, however, requires less information for regulators. With a uniform tax rate on emissions (e.g. per kilogram emitted), plants facing low costs are incentivized to invest in abatement technologies while plants facing higher costs can opt to pay the tax instead (Goulder and Parry 2008). Under such assumptions, economic instruments will be cost-effective, while performance standards will not.

Second, theoretical contributions typically conclude that emission taxes should offer incentives for green technological change and innovation that are stronger than the incentives stemming from emission performance standards (e.g., Milliman and Prince 1989). An emission tax will give plants incentives to implement low-cost abatement measures beyond their current levels to reduce tax payments while performance standards give polluters no incentives to abate emissions below the set standard. This implies in turn, the model results suggest, that economic instruments will constitute a greater spur to green technological change than in the case of standards. Imposing plant-specific standards may not even result in binding constraints for a cost-minimizing plant and its operations. For this reason, gradual tightening of limits should be considered by regulators as it raises expectations of more stringent standards in the future (Bergquist et al. 2013; Simila 2002).

While neoclassical economists tend to favor market-based instruments over command-and-control approaches to pollution control, the economic analyses of the differences between these two types of regulations often overlook the historical, technological and institutional contexts in which they are implemented (Cole and Grossman 1999). The standard-based regulations often differ in both design and implementation and are, therefore, not necessarily adopted as crudely as many economic models propose (Helfand and Berck 2018). The favored option of economic instruments in the form of emissions taxes or allowance schemes, are not necessarily perfectly designed either, e.g., when attempting to address local pollution for which the environmental damages are highly dependent on the geographical context.

The conceptual analysis of Weitzman (1974) illustrates that, if the abatement costs are shrouded in obscurity, then the standards-based approach could be more efficient than the tax if the societal consequences of miscalculations of emission quantities are high relative to the cost consequences. Mendelsohn (1984) builds on this analysis, and suggests that, when innovation is important, the bias should be in favor of emission standards. While Mendelsohn (1984) only considers investment levels, Krysiak (2008) also investigates the role of (stylized) technology choices. He concludes that different regulatory approaches may – regardless of design – lead to the adoption of different technologies, and the performance standard approach can induce an efficient choice of technology whereas an emission tax cannot. For the above reasons, when innovation is important and there is genuine uncertainty about future abatement costs, even the neoclassical literature suggests that performance standards could be more efficient than market-based policies.

There is a lot of case study evidence illustrating that performance standards could provide a significant spur to green technology adoption and innovation, outcomes that will occasionally be more profound compared to the ones induced by market-based instruments (e.g., Wallace 1995; Bergquist et al. 2013; K, Söderholm, Bergquist, and P, Söderholm 2017). For instance, Taylor, Rubin, and Hounshell (2005) examines sulfur dioxide regulation in the USA over time and contends that the original standards-based approach had had a more significant impact on green innovation (measured by patent counts) than the sulfur emissions allowance scheme that was introduced in the early 1990s.

Research has also covered the political economy of instrument choice in environmental policy, thus recognizing not only economic efficiency but also political feasibility, and, therefore, policy durability. The latter refers to the ability of a policy to withstand political changes and remain effective over an extended period, thus also achieving long-term stability for industry (Hochman and Zilberman 2023). This policy criterion is highly relevant in the ongoing transition towards zero-carbon technologies and production processes in industry and the energy sector.

Recent research on the political economy of industrial pollution regulation shows that the choice between, say, emissions taxes and standards is not a one-size-fits-all decision; it will rely on political considerations (such as the competitiveness of domestic industry) but also on the specific context and stage of technical development (Hochman and Zilberman 2021). The rationale behind this result is that to ensure policy durability and outcomes that are difficult to reverse, the regulator needs to mandate specific standards to incentivize the early adoption and development of clean technologies (see also Caparrós, Just, and Zilberman 2015). This will be especially important when novel technologies are not readily available, and the regulators are concerned about the employment and/or competitiveness impacts of the policy.

While the above illustrates that the command-and-control approach to industrial pollution is far from inferior when compared to economic instruments, it is also important to recognize that the real-life impacts of standards-based regulations will depend vastly on how these are designed and implemented in practice (e.g., Kemp and Pontoglio 2011; P, Söderholm et al. 2022). For this reason, it is necessary to ask the question of what characterizes carefully designed command-and-control industrial pollution policies. The next section is an attempt to provide some answers to that question.

The Standards-based Approach Revisited

Environmental regulation is a continuous process of both learning and experimentation, and not a one-shot exercise involving a simple case of stimulus and response. This suggests that it is crucial to focus not only on the different statutory provisions and case law, but also on how regulations are crafted and applied in practice, as well as how the relationship between the firm and the regulator develops and changes over time. Some important factors to consider when it comes to the relationship between the firm and the regulator include the information asymmetries and the knowledge procurement amongst the regulatory authorities.

The problem of information asymmetry between the firms and the regulators gives the industry representatives somewhat of a strategic advantage during the environmental regulation processes, and, if applicable, the negotiations that are part of these processes. If regulators fail to procure

the necessary knowledge to be able to either verify or challenge the information shared by the industry, the advantage remains in the hands of industry. The knowledge requirements that regulators face is not only connected to ecological expertise, but also to pollution abatement technologies and the technology and economics of these abatement technologies (Bergquist et al. 2013). If regulators lack the required level of such expertise, there is an imminent risk that performance standards will be calibrated in ways that repress efficient and innovative responses from industry. If the regulatory authorities instead manage to achieve substantial expertise it paves way for consensus- and trust-based – yet challenging – negotiations between authorities and the regulated industry.

Previous case study research shows that when expert-based and close dialogues constitute essential parts of the environmental regulation process, it has facilitated the implementation of effective performance standards in industry (e.g., Wallace 1995; Reinstaller 2008). This conclusion is partially supported by theoretical research, such as the work by Amacher and Malik (1996), which emphasizes that cooperative bargaining in environmental regulation can be more effective than non-cooperative methods. Consensus-based environmental regulations, which involve extensive knowledge creation and dissemination, are of particular importance when pollution abatement is reliant on the development of more efficient abatement technologies (Bergquist et al. 2013).

As noted above, the gradual tightening of performance standards is crucial for maintaining strong incentive effects from the standards over time. It remains, however, difficult for regulators to make decisions on such tightening of standards if there is a lack of expert-knowledge on the future emissions limits and their practicality as well as on the compliance periods that might be realistic given the new, tougher, standards.

The above shows the importance of the entire regulatory system encompassing informal rules, regulatory culture, trust, competence and knowledge generation and dissemination. Differing styles of regulatory approaches are not a new phenomenon; previous research has identified differences across countries in terms of the knowledge and trust defining the relationship between regulatory authorities and industry. Distinct national formal and informal institutions have often developed over time and influence the diverse contexts in which environmental regulations are implemented, but also designed. For example, comparative studies have contended that the regulatory style adopted historically by the U.S. government has been predominately adversarial while the corresponding styles in most European, especially Nordic, countries largely build on trust and the facilitation of information sharing between industry and regulators (e.g., Jänicke 1992; Bergquist et al. 2013; Löfstedt and Vogel 2001).

These institutional differences matter empirically. For instance, Gunningham, Kagan, and Thornton (2003) conclude, by exploring the environmental performance of pulp and paper mills in a variety of countries, that the stringency of the respective environmental regulations only explains a limited portion of the difference in outcomes. Regulatory styles, including the nature of regulator-firm negotiations, are demonstrated to be equally significant.

In addition, the Swedish environmental regulatory approach has reaped the fruits of flexible performance standards and extended probation periods as it managed to achieve a transition to deep emission reductions in the pulp and paper industry and in the metal smelting sector (Weiss, Stephan, and Anisimova 2019; P, Söderholm et al. 2022). This regulation-induced green

technological change would not have been possible without the prioritization of joint knowledge generation and transfer as well as an approach that was consensus-seeking and cooperative. These features of the Swedish regulatory system, it is argued, help explain why the development and adoption of alternative bleaching technologies were much slower in the U.S. pulp and paper industry during the 1990s. (Bergquist and Söderholm 2015).

The benefits of the cooperative and consensus-seeking regulatory approach imply that the role of a government authority in the environmental regulation process could be evaluated based on its ability to establish trust, cooperation, and productive dialogues among the participating actors. As noted above, trust-based dialogues cannot be taken for granted because the parties involved may have incentives to distort – or even conceal – vital pieces of information.

However, consensus seeking approach to industrial pollution is not devoid of weaknesses as it is also vulnerable to regulatory capture. This could be manifested in regulators choosing to tailor environmental standards to correspond to industrial plants needs rather than the needs reflected by the public interest. Studies have highlighted such rent-seeking efforts, for example by Bouvier (2009) who points out that in Maines, USA, the environmental regulations of pulp and paper mills were in part undermined by the industry's influential position in the region.

Conclusions

The command-and-control approach to industrial pollution, e.g., standards that mandate specific levels of environmental performance (e.g., a maximum allowed level of discharges) is frequently argued to be inferior to economic and incentive-based instruments – at least in (neoclassical) theory. This article has first argued that imperfectly designed economic instruments will not necessarily outperform more carefully designed standards-based pollution regulations, e.g., in terms of providing incentives for technological change. Furthermore, the transition towards zero-carbon production processes and technologies, often including major investments, rests on the introduction of climate policies that are perceived robust and credible over the long-term. In this setting, the standards-based approach tends to outperform the use of economic incentives.

For the above reasons, we ought to learn from the empirical experiences of existing pollution regulations – and not solely from theoretical reasoning. This article has therefore discussed how such regulations, not least performance standards, can be designed and implemented to regulate industrial pollution while delivering favorable conditions for investments that contribute to wider sustainability goals such as climate action. Carefully designed standards-based regulations may even trump the performance of economic instruments, e.g., in inducing significant green technological change.

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